

REMARKS

This Amendment is in response to the Office Action dated September 7, 2006. Claims 1-15 are pending in this application. Of the claims, only claims 1 and 13 are independent.

Claim Rejections - 35 USC § 103

In the Office Action, claims 1, 2, 4, 6 and 9 were rejected under 35 U.S.C. 103(a) as being unpatentable over Foti (U.S. Patent No. 4,109,543).

The gist of the present invention is the finding that a conveyor belt could be butt-joined, and does not appreciably lose flexibility, if a rather high amount of thermoplastic with respect to the fabric is used, and simultaneously the thermoplastic has a certain creep resistance. In contrast thereto, Foti aimed solely on its flexibility (abstract, column 2, lines 8-10; column 3, lines 17-18) and used in his belts a low amount of thermoplastic, with respect to the fabric. The amount ratio of thermoplastic to fabric could ideally be defined as a ratio of combined thickness of thermoplastic layers to thickness of fabric layer. However, since the thermoplastic penetrates into the fabric upon manufacture of the belt (see Foti), the thermoplastic layers do not have a defined thickness. The said thickness ratio can therefore not be measured on the belt. The instant inventor thus used the ratio r_V shown in claim 1 instead, which only contains parameters that can be determined on the belt, needs no geometrically well defined layers, and gives similar numerical values as the said (unmeasurable) thickness ratio. For the convenience of the Examiner the obtention of r_V is explained in the following.

The ratio r_V is in principle the quotient of the combined volume per unit surface of the thermoplastic layers, $V_{\text{Thermoplastic}}$, to volume per unit surface of the fabric layer, V_T :

$$r_V = \frac{V_{\text{Thermoplastic}}}{V_T} \quad (1)$$

The numerical values of r_v for any sandwiched structure thermoplastic layer 1 / fabric layer / thermoplastic layer 2 (as described in claim 1) are similar to the numerical values of the said thickness ratio for the same sandwiched structure. In formula (1), $V_{\text{Thermoplastic}}$ was then expressed as the difference between the volume per unit surface of the textile layer contained therein, V_T (assuming virtually no air in the fabric layer, see again Foti):

$$V_{\text{Thermoplastic}} = V_B - V_T \quad (2)$$

V_T in turn was replaced by the quotient of the weight per unit surface of the textile layer, G_T , to the density of the fiber material contained therein, ρ_T :

$$V_T = \frac{G_T}{\rho_T} \quad (3)$$

Using formula (3) in formulae (2) and (1), and using then formula (2) in formula (1), the inventor obtained the formula for r_v of instant claim 1.

The inventor found that for the above gist of the invention, the useful numerical range of r_v was **5 to 25** (instant claim 1). Foti's r_v values are much lower, as may be approximately calculated from his example data:

Example I: A polyester fabric of 15 oz/sq yd, which is the above G_T , was used (= 0.05086 g/cm², the also given value of 425 g/mm² is clearly wrong). The polyester is said to be "preferably at least 85% ethylene glycol terephthalate" (column 5, lines 2-4). Assuming this polyester for the fabric gives an above ρ_T of about 1.35 g/cm³ (may vary slightly on the degree of crystallinity). With this G_T , ρ_T and above formula (3), the **V_T of the polyester fabric is calculated as 0.0377 cm**. One thermoplastic mat of a low density polyethylene film with a thickness of 0.008 inch (= 0.0203 cm) was used as the starting material. Assuming this thickness as the average thickness of the mat in the finished belt (then the mat is no longer well defined, see Foti) this average thickness can approximately also be taken as the **$V_{\text{Thermoplastic}} = 0.0203$ cm**

for the mat in the finished belt. Entering the two bold values into above formula (1) (which is equivalent to the r_v formula of claim 1) gives $r_v = 0.54$.

Example II: This belt has two polyester fabrics sandwiched between three thermoplastic low density polyethylene webs. Two outside polyethylene webs have the same structure and dimensions as in example I (column 9, lines 10-13). Making the same assumptions as above they thus have an approximate $V_{\text{Thermoplastic}} = 0.0203$ cm each. The third, middle web has, as the starting material, double thickness, and thus approximately double $V_{\text{Thermoplastic}} = 0.0406$ cm in the finished belt. For one outside web and the middle web, sandwiching one polyester fabric, this gives a combined $V_{\text{Thermoplastic}}$ of **0.0609 cm**. The polyester fabric sandwiched in between these has the same structure and dimensions as in example I (column 9, lines 10-13), and thus again has approximately $V_T = 0.0337$ cm. Entering again the two bold values into above formula (1) gives $r_v = 1.81$. This r_v value applies for either of the two sandwiched fabrics of this belt.

These two r_v values of Foti are at the lower end of, or even lower than the range of r_v values indicated for prior art conveyor belts in the instant application itself (page 11, lines 13-18).

Foti's aim at obtaining flexible belts is further emphasized by the fact that the fabric layer need not mandatorily be sandwiched between two thermoplastic layers, one thermoplastic layer is also sufficient (in particular column 2, lines 12-15 and Example I). In contrast thereto, in order to obtain butt-weldability, the presence of two sandwiching thermoplastic layers is essential (instant claim 1).

Furthermore, Foti indicates polyethylene and polypropylene as exemplary thermoplastics, with "low density polyethylene" being the most preferred one (column 4, lines 3-23). Polyolefins with a creep resistance of at most 0.005 at 30°C (instant claim 1) could only be made with the arrival of specific metallocene catalysts many years after the publication of Foti (these catalysts are explained in the instant application on bridging paragraph pages 7/8). So Foti's

polyolefins and his most preferred low density polyethylene could not have the creep resistance indicated in claim 1.

In summary it is held that Foti's teaching, aiming at high flexibility, could not have made obvious to use a high amount of thermoplastic with respect to the fabric (as indicated by the range of claim 1), a mandatorily sandwiching structure thermoplastic layer/fabric layer/thermoplastic layer, and wherein the thermoplastic has the creep resistance indicated in claim 1, in order to obtain butt-weldability of the belt. Instant claim 1 is thus clearly inventive over Foti, and likewise claims 2, 4, 6 and 9 depending from claim 1.

Claims 3 and 14 were rejected under 35 U.S.C. 103(a) as being unpatentable over Foti (U.S. Patent No. 4,109,543) in view of Kuhr (PGPub 2003/0050573). Because claims 3 and 14 depend from claim 1, it is respectfully submitted that these claims are also not rendered obvious by Foti for the reasons set forth above in connection with claim 1. Kuhr is only cited for teaching the thermoplastics TPE-A, TPE-E, and TPE-U "for the purpose of using a material with the handling properties of elastomers and the processing properties of thermoplasts." Accordingly, this combination does not teach or suggest the subject matter of claims 3 and 14.

Claim 5 was rejected under 35 U.S.C. 103(a) as being unpatentable over Foti (U.S. Patent No. 4,109,543) in view of Tanimoto (U.S. Patent No. 3,616,164). It is respectfully submitted that claim 5 which depends from claim 1 is also not rendered obvious by Foti for the reasons set forth above in connection with claim 1.

Claims 11, 12 and 13 were rejected as being obvious over Foti, in view of Yu (U.S. Patent No. 5,714,290). Claims 11 and 12 depend from claim 1, and it was already pointed out that Foti does not disclose any, and even teaches away from, the structural features of the belts of instant claim 1. This also applies to the same structural features found in process claim 13. Yu does not disclose any of these missing features either, so these features are still missing, even if one combines the disclosures of Foti and Yu.

Furthermore Yu does not teach butt-end joining, as asked for at the end of claim 13, but teaches away from it: Yu states that in the *prior art* imaging belts the seam was straight, whereas in his case the seam should be “bent or wavy”, with the straight line of the seam now only being “imaginary” (column 7, lines 17-30). Since butt ends are understood in the art as essentially straight (see also bridging paragraph pages 13/14 and figure 2 of the instant application), Yu’s improvement is thus to use a “bent or wavy” seam instead of a butt-end joining.

Also, Yu concerns imaging belts, not conveyor belts, as does Foti. Any of Yu’s teachings or disclosures for end-joining can thus not be directly transferred to Foti without further adaptation.

In summary, it is held that Foti and Yu in combination do not make independent claim 13 obvious.

Claims 7, 8 and 15 were rejected under 35 U.S.C. 103(a) as being unpatentable over Foti (U.S. Patent No. 4,109,543) in view of Nord (U.S. Patent No. 6,921,502). Because all of these claims depend from claim 1, it is respectfully submitted that these claims are also not obvious for the reasons set forth above in connection with claim 1.

Accordingly, it is respectfully submitted that the Examiner has not met the initial burden of establishing obviousness and the rejections should be removed.

Conclusion

It is respectfully submitted that a full and complete response to the Office Action has been made. The claims are believed to be in condition for allowance. Early and favorable action is respectfully requested. If the Examiner has any further questions or concerns, the Examiner is invited to contact the Applicant’s undersigned attorney/agent.

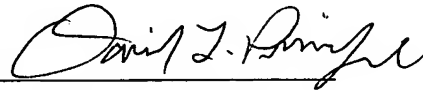
The Director is hereby authorized to deduct the fee of \$1,020.00 under 37 C.F.R. 1.17(a)(3) for a three month extension of time from Deposit Account 08-2442 of the

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undersigned. If any additional fees are occasioned by this Response, the Director is hereby authorized to charge them to, or to credit, Deposit Account 08-2442 of the undersigned.

Respectfully submitted,
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